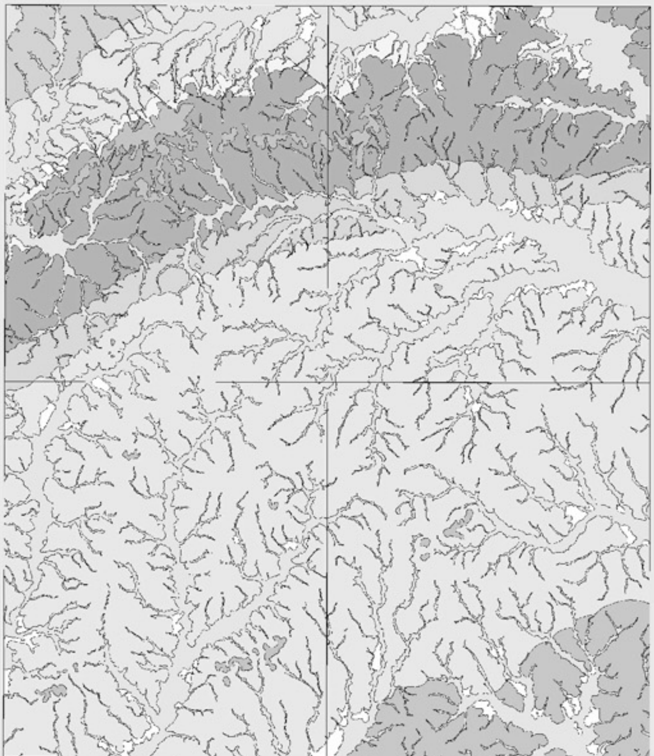
Surface Geology of the Fort Polk Region of Louisiana



Software:

The digitizing effort was performed with the Direction Trace Line String function of INTERGRAPH'S GEOVEC software. GEOVEC runs on top of Bentley's MicroStation and INTERGRAPH'S Base Imager; and it employs the MicroStation Feature Collection System. Topology was built, using ESRI's ArcInfo. The final GIS was assembled, within the ESRI ArcView environment.

Process:

INTERGRAPH

The initial digitizing effort consisted of three phases:

1. Initially, all lines were digitized from scans of the Vellum and Mylar sheets, then smoothed and filtered.
2. Circles were placed, as flags, to indicate where digitizing errors had been made.
3. Corrections were made where the flags had been placed; and the flags were removed.

Once the digitized lines had been corrected, the line cleaning process began. These tasks were all performed within the INTERGRAPH MGE environment. First, Duplicate Line Processor was run on each file of digitized linework. Duplicate Line Processor eliminates all duplicate lines and breaks all line intersections.

Each quadrangle of digitized linework was georeferenced using the Control Point Setup function of INTERGRAPH's MGE software. All eight control points, at 2.5-minute intervals, were used for each quad as we georeferenced them in the Louisiana ("State Plane") Coordinate System, North Zone, as referenced to the North American Datum (NAD), 1927.

Each digital quad file was converted into the Universal Transverse Mercator coordinate system, as referenced to the World Geodetic System (WGS), 1984, to satisfy the specifications of the U.S. Army Corps of Engineers. For quality assessment of the georeferencing process, we generated a graticule in the UTM coordinate system and overlaid it with the converted files. The graticule was created using the Grid Generation function of INTERGRAPH's MGE software.

After the alluvium and nonalluvium quads were overlaid, the composite linework was edited to show the alluvium occluding the other surface-geologic units, as it does in reality. Full-scale color plots were made for the geologists to review. The results of the reviews by the geologists were Mylar sheets of both the lines to be added and the lines to be deleted. The lines, to be added, were digitized, cleaned, georeferenced and overlaid with the alluvium and nonalluvium. Then flags were placed around the digital lines that were to be deleted. After these edits had been made the edgematching process began.

In order to achieve a seamless mosaic we planned to use the graticule, instead of the digitized quad boundaries, for the final GIS geologic quadrangle boundaries. The edgematching process began by creating a new blank design file of the same projection, overlaying it with all of the design files for each of the ten quadrangles, turning on all layers in all files, and performing a fence copy of all the linework into the new blank design file. The linework and the graticule were merged into a mosaic; and edgematching was performed, all using MGE. MGE's End Point Processor was used to flag all dangling ends for the alluvium and nonalluvium layers. All other layers were turned off, including the quad boundaries. And, with the interactive guidance of the geologists, the contacts were manually edgematched.

From this master mosaic design file, only the alluvial and nonalluvial contacts, the faults, and the graticule, for the individual quad areas were fence-copied into ten new UTM, WGS84 design files. After running the Duplicate Line Processor on each of these ten new design files, there were no duplicate lines, and intersections had been broken where the contacts and faults crossed the graticule. Finally, the short segments outside the graticule were deleted from each of these new digital quads, completing the line-development process. The next task was to create topology.

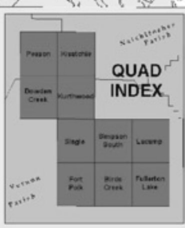
ARCINFO

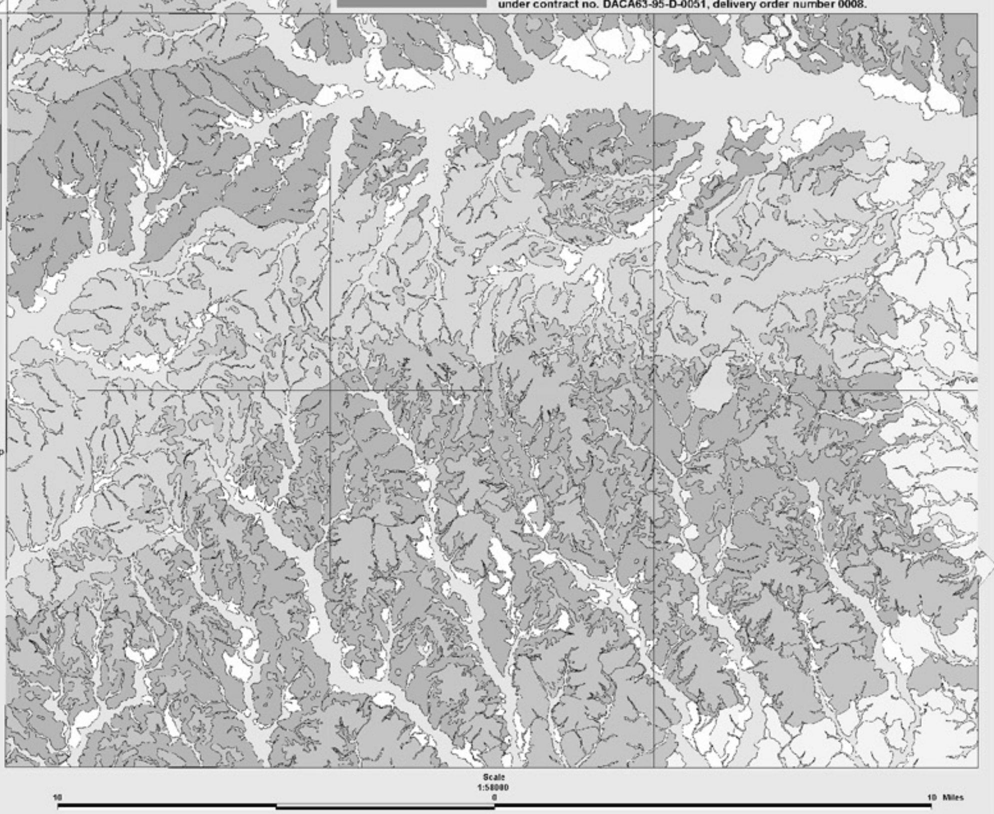
We used ArcInfo's IGDStoARC translator to translate the final ten INTERGRAPH design files into ArcInfo coverages. We then used the "Build" command in ArcInfo to construct polygon topology from the contact lines. Sometimes the process failed, indicating that some duplicate lines still remained in the digital quad. In such classes, MGE's Duplicate Line Processor was run again on the final design file, before attempting to translate again and build topology.

ARCVIEW

Once polygon topology was constructed for the ArcInfo coverages, they were then translated into ArcView shapefiles, by simply "Adding" them to an ArcView View window and "Converting" them into ArcView shapefiles. The database for each shapefile was populated with attributes within ESRI's ArcView software. After populating the database with geologic-unit abbreviations, we sorted the "Area" field into ascending order, smallest to largest, to facilitate finding any silvers that might exist. These silvers were "Unioned" with adjacent unit polygons, one by one, in ArcView. Finally, customized hues were created in ArcView for each geologic unit type. ArcView could then automatically render all the unit polygons, for each of the ten shapefiles, by reading the unit abbreviations within each shapefile database. After completing the population of the databases with feature attribute records and performing final quality assurance tasks, the data development was complete.

Prepared by the Louisiana Geological Survey
for the U.S. Army Corps of Engineers, Fort Worth District,
under contract no. DACA63-95-D-0051, delivery order number 0008.





KEY

Faults

- Fault
- Fault, approximately located
- Fault, inferred
- Fault, concealed

Geologic Units

- Holocene unnamed alluvium (Undifferentiated)
- Big Brushy formation
- Prairie Allogroup (Undifferentiated)
- Upper Lissie Formation, Intermediate Allogroup
- Lower Lissie Formation, Intermediate Allogroup
- Gravel Hill allomember, Willis Formation, Upland Allogroup
- Tower Road allomember, Willis Formation, Upland Allogroup
- Dugout Road allomember, Willis Formation, Upland Allogroup
- Kisatchie allomember, Willis Formation, Upland Allogroup
- Fort Polk allomember, Willis Formation, Upland Allogroup
- Willis Formation (Undifferentiated), Upland Allogroup
- Blounts Creek Formation, Fleming Group
- Castor Creek Formation, Fleming Group
- Williamson Creek Formation, Fleming Group
- Dough Hills Formation, Fleming Group
- Carnahan Bayou Formation, Fleming Group
- Lena Formation, Fleming Group
- Catahoula Formation
- Vicksburg Group (Undifferentiated)
- Jackson Group (Undifferentiated)
- Cockfield Formation, Claiborne Group
- Lake